SECTION 94

ASPHALTIC EMULSIONS

Asphaltic emulsions shall conform to Section 94 of the Caltrans Standard Specifications and these City Standard Specifications.

94-1.01 Description. - In addition to the bituminous emulsions specified in Section 94 of the Caltrans Standard Specifications, this Section includes a cationic maltenes emulsion material composed of a petroleum resin oil base uniformly emulsified with water.

Emulsified asphalts are classified according to penetration, high viscosity or mixing type, either as anionic or cationic as described herein.

RS1	-	Rapid setting penetration type anionic emulsion.
RS2	-	Rapid setting penetration high viscosity type anionic emulsion.
SS1	-	Slow setting mixing type anionic emulsion.
SS1h	-	Slow setting mixing type anionic emulsion hard.
CRS1	-	Rapid setting penetration type cationic emulsion.
CRS2	-	Rapid setting penetration high viscosity type cationic emulsion.
CMS2S	-	Medium setting sand mixing type cationic emulsion.
CMS2	-	Medium setting coarse aggregate mixing type cationic emulsion.
CMS2h	-	Medium setting coarse aggregate mixing type cationic emulsion hard.
CQS1h	-	Quick setting asphaltic emulsion for slurry seal.
CSS1	-	Slow setting coarse aggregate mixing type cationic emulsion.
CSS1h	-	Slow setting coarse aggregate mixing type cationic emulsion hard.
LMCRS2	-	Rapid setting latex modified cationic emulsion.
LMCRS1-1/2h	-	Rapid setting latex modified cationic emulsion hard.
LMCRS2h	-	Rapid setting latex modified cationic emulsion hard.
	-	Maltenes cationic emulsion.

94-1.02 Requirements. - The asphaltic emulsion shall conform to the requirements prescribed in Tables 1 and 2 of Section 94 of the Caltrans Standard Specifications and in Tables 3, 4, and 5 of these specifications.

94-1.04 Method of Test. - The properties of the asphaltic emulsions given in Tables 3 and 4 shall be in accordance with AASHTO Designation: T59, "Testing Emulsified Asphalt" except as otherwise noted.

TABLE 3

Requirements for Latex Modified Cationic Emulsion

	LMCRS2	LMCRS2h	LMCRS1-1/2h
Tests on Emulsions:			
Viscosity SSF @ 122° F sec	75-300	75-300	40-100
Sieve, percent	--	0.3	0.3
Settlement, 5 days, percent	5	5	5
Demulsibility, percent	0.3 max.	40 min.	40 min.
Storage Stability Test, 1 day, %	--	1	1
Particle Charge	Positive	Positive	Positive
Ash Content (ASTM D3723), %	0.2 max.	0.2 max.	0.2 max.
Tests on Residue by Drying:			
Residue, percent (Calif. Test 331)	65 min.	65 min.	65 min.
Penetration @ 77° F	100-200	40-90	40-90
Ductility @ 77° F 5 cm/min, cm	40 min.	40 min.	40 min.
Torsional Recovery % (Calif. Test 332)	18 min.	18 min.	18 min.

TABLE 4

Requirements for Cationic Maltenes Emulsion

Specification Designation	Test Method	Requirements
Viscosity, S.F. at 77° F, seconds	AASHO T 59	15-40
Residue - % Min	California Test 351	60
Miscibility Test (b)	AASHO T 59	No coagulation
Sieve Test (a) (Distilled Water) % Max.	AASHO T 59	0.10
Particle Charge Test	California Test 343	Positive
Tests on Residue from California Test 351		
Viscosity, CS 140° F	ASTM D 445	100-200
Asphaltenes, % Max.	California Test 352	0.75

(a) Test procedure identical with AASTHTO T 59 except that distilled water shall be used in place of 2 percent sodium oleate solution.

(b) Test procedure identical with AASHTO T 59 except that .02 normal calcium chloride solution shall be used in place of distilled water.

TABLE 5

Requirements for CQS1h Asphaltic Emulsion

Test on Emulsion

Test	Test Method	Requirement
Viscosity, SSF @ 122°F.	AASHTO T 59 ASTM D 244	15-90 seconds
Sieve ASTM D 244	AASHTO T 59 maximum	0.30 percent
Storage Stability, 1 day	AASHTO T 59 ASTM D 244	1 maximum
Residue by Distillation	AASHTO T 59 ASTM D 244	57 percent minimum

Test on Residue from Distillation Test

Penetration @ 77°F.	AASHTO T 49 ASTM D 5	40 - 90
Ductility @ 77°F., 5 cm per minute	AASHTO T 51 ASTM D 113	40 cm. minimum
Solubility in Trichloroethylene	AASHTO T 44	97 percent minimum

In addition, quick setting Type CQS1h asphaltic emulsion shall test Positive for Particle Charge when tested in accordance with ASTM E 70. If the Particle Charge Test result is inconclusive the asphaltic emulsion shall meet a pH requirement of 6.7 maximum.

94-1.06 Applying. - Setting Grade 1-1/2 asphaltic emulsions shall be applied between 80° F and 140° F, unless otherwise directed by the Engineer.

Distributing equipment shall be the same as specified in Section 93, "Liquid Asphalts," except that hand spraying by means of hose or bar through a gear pump or air tank will be acceptable for applications to 0.10 gallon per square yard for flat work or tacking of vertical edges.